currence of conditions of an estuary nature, and leads to the inference that the circumstance under which the silt was deposited approached such as now prevails at the mouths of rivers.

"The occurrence of marine forms of Diatoms in silt, puts us in possession of another element, by means of which we are enabled to ascertain the changes which have taken place in the physical geography of the earth. It furnishes us with a means applicable in many instances where other and more perfect organisms have disappeared, the siliceous skeletons of these minute bodies being capable of resisting that agent by means of which the solid coverings of molluscs are dissolved. Many of the raised sea-beaches, now affording no shells, will probably be found to contain Diatoms, which will tell of the conditions under which these raised sea-beaches were originally deposited, and provide us with information concerning the circumstances which operated in the production of strata of this nature."

Dr. Gregory alluded to the interesting fact that Diatoms had been found by Ehrenberg in all fossiliferous rocks as far down as the Silurian; and that while the higher organisms exhibited striking differences in the rocks of different epochs, there was, in the case of Diatoms, a striking similarity.

4. "Notice of the time of Flowering of certain Trees and Shrubs in the Royal Botanic Garden during the past month," by Mr. M'Nab.

5. "Notes on the Effects of last winter upon Plants in the Royal Botanic Garden, Belfast," by Dr. Dickie, Professor of Zoology and Botany, Queen's College, Belfast.

The lowest point to which the thermometer fell during the month of February 1855 was on the 15th, viz. 13° F. In 1845, on March 5th, the thermometer in the Botanic Garden indicated 10° F., lower, than in 1855. The injury to the plants, however, in 1855, was greater, because in February last a generally low temperature, with east and north-east winds, prevailed during two weeks.

6. "Account of the Origin and of some of the Contents of the Museum of Economic Botany attached to the Royal Botanic Garden of Edinburgh," by Professor Balfour.

MISCELLANEOUS.

On the Organization of the Pedicellate Glands of the Leaf of Drosera rotundifolia. By M. A. Trécul.

There are some plants certain organs of which are capable of executing very remarkable movements under the influence of a mechanical excitement. Amongst these are the leaves of *Mimosa pudica* and *sensitiva*, and of *Dionæa muscipula*, the stamens of *Berberis*, &c. The *Drosera* has been classed with the plants which possess this singular property. It is generally supposed that as soon as a fly or other insect, attracted by the viscous juice secreted by the

glanduliferous hairs which cover the surface of the leaf, settles upon it, the hairs stiffen and curve towards those of the opposite side, so as to form a sort of net under which the little creature remains imprisoned. It is certain that we often find one or more insects struggling or dead under the hairs of this leaf, and this, I believe, is the best proof that we possess of the excitability and movements of the hairs in *Drosera*. I think however that these hairs are not excitable, and that they are incapable of performing the movements attributed to them. I have often endeavoured to irritate them, but have never succeeded in observing anything which would indicate the least degree of excitability, although I have been placed in circumstances very favourable for these experiments; for after a recent shifting of the Orchideous plants at the Museum, a great many specimens of *Drosera* grew up amongst the *Sphagnum* employed in this operation, and there were for a long period leaves of all ages in the conservatory, so that I was enabled to experiment upon organs at different degrees of development. Nevertheless, I never perceived the least inflexion which was not occasioned by the pressure which I employed.

It appears to me that the following is the cause of the capture of insects by the leaves of *Drosera*. During their development these leaves are rolled in upon themselves, the margins of the limb are curved towards the centre, and the hairs have the same direction. In growing, the limb spreads by degrees and the hairs also stiffen successively from the circumference to the centre. If, before the whole of the hairs have become stiff, some insect comes to suck the viscous juice which exudes from their glands, it presses into the space which they leave between them at the centre of the leaf, and becomes entangled in the mucosity. The growth of the leaf continues nevertheless, the incurved hairs are straightened one after the other, but the unfortunate insect dies before they become quite straight.

The glands which secrete the viscous matter above mentioned are deserving of the attention of botanists from their interesting structure, which has not yet been sufficiently studied. Meyen gives the most detailed description of them in his memoir 'Ueber die Secretions-Organe der Pflanzen;' but this description, although apparently minute, is notwithstanding very incomplete. It may be resumed as follows:—"The glands of *Drosera* are elliptical and pedicellate; a spiral vessel runs up the pedicel and penetrates into the gland." Meyen adds in his 'Physiology' (p. 478), that the gland, like the pedicel, consists of a very compact cellular tissue. Let us now see whether this is the structure of the secreting organs. We shall soon see that the form of the glands of the margin of the leaf of *Drosera rotundifolia* has not even been indicated. In fact Meyen has only described the elliptical pedicellated glands, and yet he speaks of marginal and central glands; but he only distinguishes their inequality of size: he has seen only that they are longer than the others, but has not noticed that their organization is different.

The marginal glands which form the fringes of the leaf have a very different form from those of the surface. In the marginal glands, the substance of the pedicel seems to expand at the apex into an elegant oblong cup, at the bottom of which the carmine-coloured glandular tissue is spread. The central glands on the contrary are simple papillæ of a more or less rounded, ovoid or elliptical form, the outer ones being of a more or less red tint, whilst those nearest to the middle of the limb are colourless.

The structure both of the central and marginal glands is very remarkable, for it is not merely a single spiral vessel that exists in the gland, but a voluminous group of large reticulated cells occupies the centre of the organ. These reticulated cells have expanded meshes in the colourless central glands of the leaf, but the meshes of those nearest the margin are narrow. The middle of the marginal glands is also occupied by a considerable group of similar cells.

The pedicels of the marginal glands are dilated at the base and of a green colour; they become insensibly narrower, their green colour becomes paler and passes to rose in the upper part which supports the gland, which is elongated and attenuated at the base. These pedicels are composed of an epidermis, a coloured parenchyma, and a vascular system. 1. The epidermis is formed of long cells, which become shorter from the base of the pedicel to its apex; they are colourless at the base of the organ, tinged with rose colour at its upper part. In many cases the epidermic, or rather superficial utricles, were furnished with grains of chlorophyll on the wall contiguous to the green parenchyma: this is a fact to which I would call the attention of anatomists. Some small stomata are most frequently scattered between the epidermic cells towards the dilated base of the pedicel, and some may even be found at a considerable height upon it. There are also some small eminences, or short, simple or bifurcated hairs, scattered on its surface. 2. The green parenchyma is also composed of elongated cells, which contain a proportion of chlorophyll equal to that of the tissue of the leaf itself. This parenchyma goes on diminishing with the diameter of the pedicel, so that towards the top it only consists of one or two series of cells surrounding the vascular axis; the green matter also diminishes in the interior of the cells, and at last is even sometimes replaced by the rose colour. 3. The vascular system is usually composed of single central bundles, but towards the base of the pedicel there are sometimes two bundles distant from each other which unite higher up. Each bundle is composed of two or three tracheæ of great delicacy, often having two spiral fibres at a little distance and turning in the same direction.

This is the structure of the pedicels of the marginal glands. If we examine that of the glands themselves, from their posterior to their anterior face, that is to say, from the surface corresponding with the lower surface of the leaf to that which corresponds with the upper, we find the elements arranged in the following manner. First, there is an epidermis of colourless or rose-coloured cells, then a layer of cells

containing chlorophyll of a pale green or nearly yellow colour;—these two parts form the oblong and slightly concave cup already referred to, at the bottom of which the vascular system, considerably increased, is placed. Lastly, these vessels or reticulated cells are covered by utricles of a carmine red colour. They form on the surface of the cup, with the vascular cells which they enclose, a prominent oblong gland, which is very elegantly bordered by the periphery of the cup.

The order in which these elements are presented, is not without analogy with that which rules the arrangement of those of the stem of a Dicotyledonous plant. Thus, in this respect, we may compare these marginal glands (as has been done with leaves) to a segment of the stem of a plant with two cotyledons. Thus at the exterior of the gland there is an epidermis as in the segment of stem, and then a layer of cells with green matter, representing the herbaceous envelope; then the vessels as in a stem; and lastly, the rose-coloured cellular tissue of the gland represents the pith. This comparison is the more just, as the glands which fringe the leaf are, so to speak, only the termination of the delicate teeth of the latter represented by the pedicels, just as the marginal glands of the stipules of roses terminate their much shorter teeth and even their nervures.—*Comptes Rendus*, 25th June 1855, p. 1355.

On a new Organ observed in Callitriche (C. platycarpa, *&c.*). By M. A. Chatin.

The organs for which I propose the name of cystiæ give a whitish appearance to the lower surface of the leaves in *Callitriche*, where they exist in immense number. Under the lens they appear like brilliant points, but the microscope shows that each cystia is a small utricular apparatus presenting a closer esemblance to a doctor's cap*.

The cystiæ are usually formed of eight cells, enlarged at their apical or free portion, and united in a common, narrow circular base, inserted into the larger, irregular cells of the epidermis. Towards the middle and upper parts the cystia is adorned with ribs, like some Cucurbitaceous and Euphorbiaceous fruits (especially that of *Hura crepitans*).

These organs are at first filled with a liquid, which is often replaced by gases (oxygen, nitrogen, and carbonic acid) towards the period of flowering. The liquid usually contained in these organs contains floating granules, which sometimes attach themselves to the walls, and which are, for the most part, rendered brown by iodine. The cystiæ when filled with gas serve as floats; their presence coincides with the absence of pneumatophora in the tissue of the leaves.

The organogeny of the cystiæ is peculiar. Each of them, like the stomata, arises from a cell which is distinguished by its small size and its rounded form from the large twisted cells which constitute the epidermis. Like that of the stomata, the original cell of the

* The peculiar structure in question was described by Dr. Lankester in 1850; see *Ann. Nat. Hist.* vol. vii. S. 2. p. 423.—Ed.